Si-tracker simulation status

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Outline

1. Modification of the track finding and track fit using the EMCal clusters
2. Checking how additional Si-“z”-layer helps track finding and track fit

Track finding/fit using the EMCal clusters

I'm modifying the track finding and track fit schemes using the EMCal clusters;

1) track finding by using MAPS + Si-tracker + EMCal
   - loading the EMCal cluster node in the track reconstruction codes (PHG4HoughTransform)
   - finding and fit were basically working, but the best-fit z-vertex seems shifting to +2-3 cm (investigation ongoing)
   - probably we need an additional Si-strip 'z'-layer ? (see page 4-5.)

2) hit information (r, φ) in a thiner outer tracker are associated to each candidate track found in the step 1)
   - I assume a thiner outer tracker cannot determine z-position
   - the outer tracker's candidate hits are searched by an intersection of each track and each outer tracker layer.
   - it looks working.

3) and then track fit by using all layers.
   - debug in progress, so no report today.

Si-strip “z”-layer

- Track finding and fit using EMcal were basically working, but the best-fit z-vertex seems shifting to +2-3 cm (investigation ongoing)
  - probably we need an additional Si-strip ‘z’-layer ?

- Checking how additional Si-“z”-layer helps track finding and track fit; I’m currently using the non-pileup G4 simulation and need to see benefits of the z-layer in pileup simulations.

Effects of the Si-"z"-layer to ϒ mass dist.

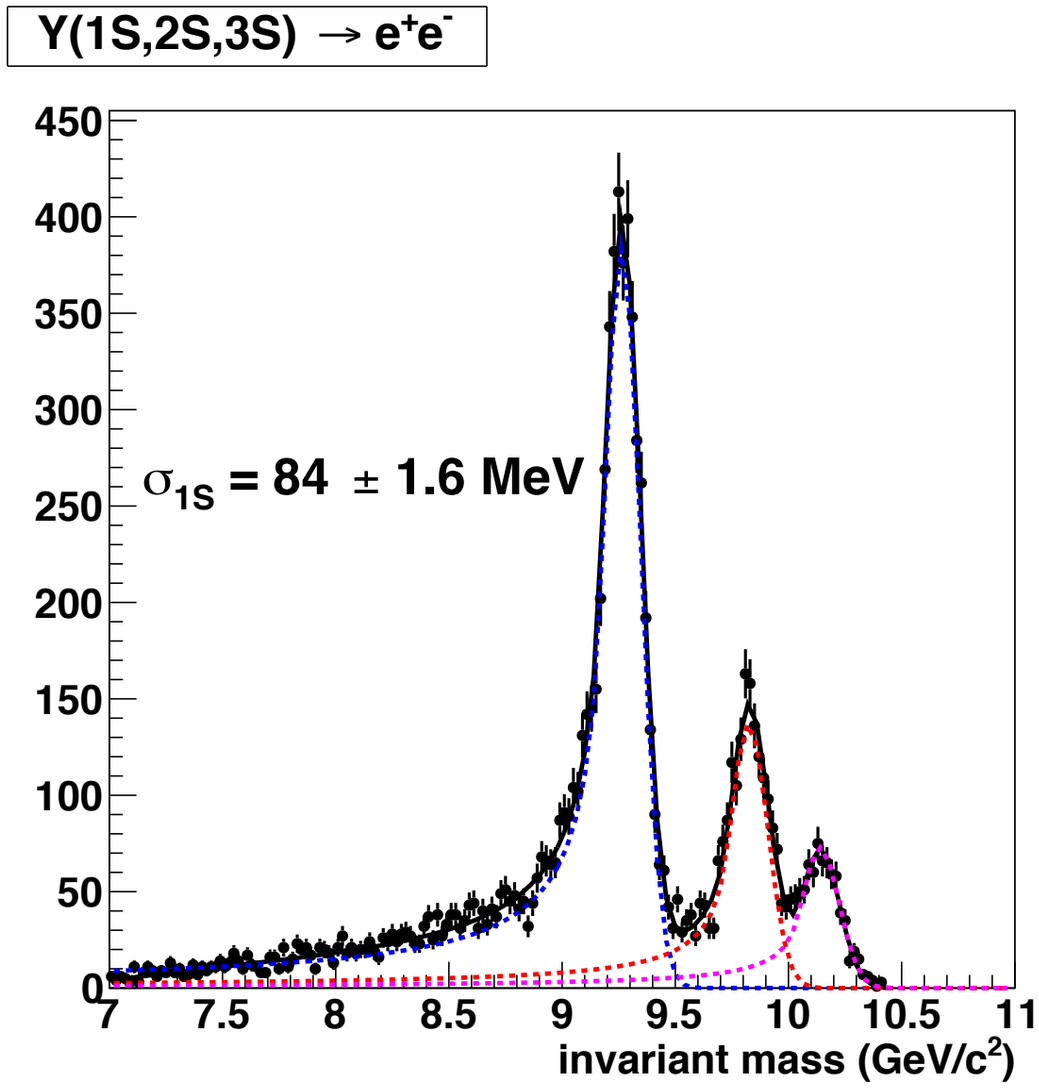
- ***Inner tracker***
  - First MAPS layer with 100 % live area: R = 2.335 cm.

- ***Intermediate tracker, Type-I (z-layer)***
  - four layers of silicon-strip detectors: R = 5 cm
  - one strip corresponds to 80 μm (φ) x 80 μm (z)
  (I wanted to implement at 10 mm (φ) x 80 μm (z), but large φ size significantly reduce track finding efficiency. Thus I'm temporarily using fine φ segments.)

- ***Intermediate tracker, Type-II (φ-layer)***
  - four layers of silicon-strip detectors: R = 6, 8, 10, 12 cm
  - one strip corresponds to 80 μm (φ) x 12 mm (z)
  - one chip per one cell, so no strip ganging.

- ***Outer tracker***
  - a chamber consisting of six pads/layers placed at R = 77.5, 79.0, 80.5, 82.0, 83.5, and 85.0 cm
  - modeled as very thin si-strip with δφ = 100μm and dz = 1mm.

Single upsilon
(with internal Bremsstrahlung)



ref: 1 MAPS + Si-strip (4 φ-layers) + thiner outer tracker gives σ_{1S} = 78 MeV/c.